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P4.001 Coupled seismic analyses of the ITER Tokamak Complex building and Tokamak machine

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ITER is probably the most ambitious energy project in the world today, whose main objective is demonstrating the scientific and technical feasibility of nuclear fusion as an energy source. 35 nations are collaborating to build the world's largest tokamak fusion reactor, a magnetic fusion device that has been designed to prove the feasibility of fusion as a large-scale and carbon-free source of energy.
The ITER design must face a large variety of potential threats and complex loads, including seismic events. These are a design driver for many of the ITER buildings and main mechanical components, including the Tokamak machine and the building that supports it: the Tokamak Complex. The Tokamak Complex is a reinforced concrete building that houses the 23000-ton Tokamak machine, where the fusion reaction will take place. The Tokamak Complex is more than 70 m high, its plan dimensions correspond to those of a standard football stadium and it will become one of the largest seismically isolated structures ever built.
As a nuclear facility, the seismic design of ITER must ensure the corresponding seismic safety requirements are met according to the French regulation. On the other hand, too conservative approaches may have important technical and financial consequences.
This article provides a global summary of the latest works carried out by the European Domestic Agency, Fusion for Energy (F4E), for the definition of the seismic environment within the ITER Tokamak Complex, including the derivation of seismic floor response spectra as well as the characterisation of the complex interface seismic forces between the Tokamak machine and the building, which are critical for a correct design of the corresponding supporting elements.
This paper does not commit IO as nuclear operator.

Presenter: RUEDA, Fernando (Mechanics ESTEYCO)

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